

Lakes of the United States. An unusual number of barometric depressions moved southeastward from the British Northwest Territory over the Missouri Valley and the Lake region, and passed thence eastward attended by local rains and thunderstorms. Persistent and heavy rains in the Middle-Eastern and Southeastern States, and dry warm weather in New England and parts of New York were notable features of the month. From the 26th to 28th a frost-bearing cool wave, for which warnings were issued, overspread the Northwestern States and the extreme upper Mississippi Valley.

BOSTON FORECAST DISTRICT.

The month was exceptionally warm and dry. On the 6th severe thunderstorms occurred in western Massachusetts and parts of New Hampshire, and on the 21st in western Massachusetts. No storm warnings were ordered and no high winds occurred on the coast.—*J. W. Smith, District Forecaster.*

NEW ORLEANS FORECAST DISTRICT.

Precipitation was unevenly distributed, being excessive in some districts and deficient in others. Temperature changes were slight. Special warnings were not issued or required.—*I. M. Cline, District Forecaster.*

LOUISVILLE FORECAST DISTRICT.

Sluggish barometric conditions prevailed. Showers were frequent and there were some heavy local rains. Though no very high temperatures occurred, humid and warm weather prevailed until the 27th, when cooler weather set in. No special warnings were issued and none were required.—*G. B. Wurtz, Local Forecaster.*

CHICAGO FORECAST DISTRICT.

The month was generally uneventful. From the 26th to 28th frost warnings were issued for frosts that occurred at points in Nebraska and northern Iowa on the 27th and in the cranberry districts of Wisconsin on the 27th and 28th.—*H. C. Frankenfield, Professor and District Forecaster.*

DENVER FORECAST DISTRICT.

The month was cooler than usual with the greatest deficiency of temperature in southern portions of New Mexico and Arizona. Less than the usual amount of rain fell in Colorado and adjacent parts of Wyoming and New Mexico, while in western Wyoming, Utah, Arizona, and southern New Mexico the rainfall was abnormally heavy and at a number of stations exceeded all previous records for August. No special warnings were issued or required.—*F. H. Brandenburg, District Forecaster.*

SAN FRANCISCO FORECAST DISTRICT.

The month, as a whole, was a quiet one. There were thunderstorms with resulting washouts in the Salton and Colorado deserts during the first and second decades of the month. On the 11th showers were general in Nevada and the Sierra

Madre. On the 18th heavy rains occurred in the valley of the Colorado and numerous thunderstorms in Nevada. Showers were general in southern California and Nevada on the 20th and 21st.—*A. G. McAdie, Professor and District Forecaster.*

PORTLAND, OREG., FORECAST DISTRICT.

The month was quiet and no special warnings were issued or required. The temperature averaged slightly above normal and precipitation was deficient, except in a few localities, where heavy local rains occurred. Owing to the dry weather there were numerous forest fires, which destroyed a large amount of property. The dry weather also resulted in unusually low stages in the rivers.—*E. A. Beals, District Forecaster.*

RIVERS AND FLOODS.

With the exception of the rivers of North Carolina, South Carolina, and Texas, and the lower portion of the Arkansas River, there were no high stages during the month.

The Mississippi River was highest during the first of the month in the lower, and the last of the month in the upper portion.

The Ohio and Missouri rivers were highest during the middle of the month, due to the general rains of that period. The rivers of the Carolinas were also affected by these rains, which caused high water, and the additional precipitation during the last of the month over the watersheds of these rivers caused flood stages on the Roanoke, Cape Fear, Pedee, Catawba, Wateree, Broad, and Saluda rivers, especially in the lower portions. The warnings were issued for the high water well in advance, and were, in nearly all instances, fully verified.

Unusually heavy local rains over the headwaters of the Colorado and Trinity rivers of Texas caused rapid rises of those streams. The Trinity reached flood stages on its upper portion only, while the Colorado overflowed over its entire length. Warnings were issued on August 7, for the floods of the 12th to the 15th in the lower Colorado River.

On August 9 and 10, warnings were issued for high water in the Arkansas, although flood stages were not expected. These warnings were fully justified.

The Columbia and its tributaries fell slowly throughout the month.

The highest and lowest water, mean stage, and monthly range at 268 river stations are given in Table VI. Hydrographs for typical points on seven principal rivers are shown on Chart I. The stations selected for charting are Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississippi; Cincinnati and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.

THE WEATHER OF THE MONTH.

By Mr. P. C. DAY, Assistant Chief, Division of Meteorological Records.

PRESSURE.

The distribution of mean atmospheric pressure is graphically shown on Chart VI, and the average values and departures from the normal are shown in Tables I and V.

No marked variations from the normal occurred in the distribution of the average pressure during the month.

The areas of low pressure originated mainly over the Canadian northwest, moved southeast over the Missouri Valley, recurved northeastward to the Lakes, and passed eastward north of the St. Lawrence Valley.

The areas of high pressure, as a rule, also passed eastward north of the boundary.

As a result of the unusual northern paths of the highs and lows, the greater part of the territory of the United States was not within the influence of any marked atmospheric dis-

turbance during the month. Stagnant atmospheric conditions prevailed and any marked variation from the normal of the several elements was due in the main to local conditions.

Pressure was slightly below normal in the Lake region, Ohio, upper Mississippi, and lower Missouri valleys, and generally west of the Rocky Mountains, except over northwest Washington. It was slightly above normal over the Atlantic and Gulf States, Texas, and the Plains region.

TEMPERATURE.

Average temperatures above the normal prevailed over all districts of the United States and Canada, except over western Texas, the Rocky Mountain and eastern Plateau sections, southern California, and the coast of Washington.

Nearly continuous warm weather prevailed over the Lake region and eastward over New York and New England, where

the monthly averages exceeded the normal from 2° to 5° per day, and at a number of points they were the highest ever recorded in August.

Over the Ohio and upper Mississippi valleys, the Middle Atlantic and east Gulf States, temperatures were well above the average, due in the main to the humid conditions of the atmosphere preventing radiation at night, with resulting minimum temperatures uniformly higher than the average. Over western Texas and the southern Rocky Mountain region the month was uniformly cool. No periods of excessive heat occurred, except over eastern Montana and North Dakota, where maximum temperatures above 100° were of frequent occurrence from the 11th to the 18th; and over the New England States, where temperatures as high as any previously recorded in August were observed on the 19th.

The usual high temperatures, ranging from 100° to 110°, or more, were recorded in southwestern Arizona and southeastern California.

Freezing temperature and killing frosts occurred at the higher elevations in the mountain districts and in the northern portions of North Dakota and Minnesota.

PRECIPITATION.

The precipitation during August, while generally abundant for the needs of growing vegetation, was very unevenly distributed as to the total fall, due largely to the local character of the storms. As the general atmospheric disturbances were confined, in the main, to the Lake region and upper Mississippi and Missouri valleys, the precipitation over other sections of the country came largely from local thunderstorms. The irregular distribution of the rainfall is graphically shown on the chart of monthly precipitation, where areas of marked excess appear, while nearby sections frequently show corresponding deficiencies. Over large sections of the Middle Atlantic States, the Mississippi and Missouri valleys, northwestern Texas, Oklahoma, and the southern Rocky Mountain section, the precipitation was heavy and persistent. Over sections of Maryland and Virginia the total fall was the highest on record for the month; and at Washington, D. C., the amount measured, 14.36 inches, was the greatest recorded in any month during a period of nearly seventy-five years of reliable observation. Especially heavy rains prevailed over the central portion of western Maryland on the 2d, where amounts from five to nearly nine inches were recorded in periods of twenty-four hours or less. In parts of western Texas, central Oklahoma, southeastern South Dakota, and the southern parts of Arizona and New Mexico the precipitation was in excess of the record for any previous August. Over practically the whole of Arizona and New Mexico, and portions of Colorado, Utah, and Nevada, the precipitation was generally well distributed during the entire month, and the run-off from the heavy falls added large volumes to all streams in that section, and a plentiful supply of water was available for all purposes.

Throughout nearly all sections where precipitation normally prevails during August the fall was well distributed during the several periods of the month and no serious lack of moisture was experienced by growing vegetation. Small sections over the Gulf coast received extremely small total amounts of precipitation and there was a general deficiency in the monthly amounts over most of New England and the northwest coast of Washington.

HUMIDITY AND CLOUDINESS.

The humidity was in excess of the normal in nearly all districts as was also the average cloudiness.

The excessive amount of moisture, the preponderance of cloudy and rainy days, and the general stagnant condition of the atmosphere, as shown by the decreased wind movement, made the weather for the month, as a whole, mentally depressing and physically enervating.

In Canada.—Prof. R. F. Stupart says:

The mean temperature of the month was higher than the average over the larger portion of the Dominion, districts near the coast and in northern British Columbia alone showing a temperature lower than the average. The highest positive departures, from 4° to 5°, occurred in the more central parts of Ontario and New Brunswick, while in the St. Lawrence Valley, the excess of the average was about 3°, and in the Northwest Provinces it was very generally between 1° and 2°.

In Canada.—Professor Stupart says:

The rainfall was less than the average over the greater part of the Dominion, portions of Ontario lying east and south of the Georgian Bay and immediately north of Lake Erie, together with the more southern portions of Alberta, alone showing a small excess, and even in these districts the larger fall was due to a few local thunderstorms. In the more northern parts of the Northwest Provinces and in British Columbia it was particularly scant, being very generally less than an inch; and in the Ottawa and upper St. Lawrence Valleys it was for the most part between one and two inches.

Average temperatures and departures from the normal.

Districts.	Number of stations.	Average temperatures for the current month.	Departures for the current month.	Accumulated departures since January 1.	Average departures since January 1.
New England	9	69.8	+ 2.3	+ 5.5	+ 0.7
Middle Atlantic	13	76.0	+ 2.6	+ 7.9	+ 1.0
South Atlantic	10	80.0	+ 2.1	+ 1.0	+ 0.1
Florida Peninsula *	8	81.3	- 0.1	- 1.1	- 0.1
East Gulf	8	80.9	+ 1.4	- 6.6	- 0.8
West Gulf	7	80.8	- 0.2	- 4.2	- 0.5
Ohio Valley and Tennessee	12	77.2	+ 2.7	0.0	0.0
Lower Lake	8	73.2	+ 3.8	+ 9.5	+ 1.2
Upper Lake	10	69.8	+ 3.7	+ 13.7	+ 1.7
North Dakota *	8	66.6	+ 0.5	+ 14.6	+ 1.8
Upper Mississippi Valley	13	74.6	+ 2.2	+ 3.0	+ 2.4
Missouri Valley	11	74.1	+ 1.1	+ 7.7	+ 1.0
Northern Slope	7	67.3	- 0.5	+ 6.7	+ 0.8
Middle Slope	6	74.8	+ 0.2	+ 1.0	+ 0.1
Southern Slope *	6	76.3	- 2.0	- 9.1	- 1.1
Southern Plateau *	13	74.8	- 1.9	+ 0.7	+ 0.1
Middle Plateau *	8	69.2	- 0.8	0.0	0.0
Northern Plateau *	12	68.7	+ 0.2	+ 12.5	+ 1.6
North Pacific	7	61.9	+ 0.5	+ 11.1	+ 1.4
Middle Pacific	5	64.2	- 0.4	+ 9.4	+ 1.2
South Pacific	4	71.4	0.0	+ 6.0	+ 0.8

* Regular Weather Bureau and selected cooperative stations.

Average precipitation and departures from the normal.

Districts.	Number of stations.	Average.		Departure.	
		Current month.	Percentage of normal.	Current month.	Accumulated since Jan. 1.
New England	9	Inches. 2.40	63	Inches. -1.4	Inches. -0.4
Middle Atlantic	13	7.57	166	+3.0	+2.5
South Atlantic	10	6.21	97	-0.2	0.0
Florida Peninsula *	8	8.02	116	+1.1	+9.0
East Gulf	8	4.77	87	-0.7	-4.3
West Gulf	7	3.07	91	-0.3	-6.6
Ohio Valley and Tennessee	12	3.58	103	+0.1	-5.4
Lower Lake	8	3.42	121	+0.6	-3.5
Upper Lake	10	3.01	103	+0.1	-2.1
North Dakota *	8	2.08	117	+0.3	+2.1
Upper Mississippi Valley	13	4.42	147	+1.4	-1.2
Missouri Valley	11	5.12	170	+2.1	-0.6
Northern Slope	7	2.63	198	+1.3	+1.5
Middle Slope	6	3.33	137	+0.9	-0.5
Southern Slope *	6	5.08	213	+2.7	+3.2
Southern Plateau *	13	2.24	145	+0.7	+2.9
Middle Plateau *	8	1.26	147	+0.4	+4.0
Northern Plateau *	12	0.85	189	+0.4	+0.1
North Pacific	7	0.20	22	-0.7	-8.3
Middle Pacific	5	0.02	17	-0.1	+4.5
South Pacific	4	0.04	100	0.0	+6.4

* Regular Weather Bureau and selected cooperative stations.

Maximum wind velocities.

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
Amarillo, Tex	7	50	se.	Mount Tamalpais, Cal.	21	50	sw.
Havre, Mont.	13	56	sw.	Point Reyes Light, Cal.	12	60	nw.
Mount Tamalpais, Cal.	12	54	nw.	Sand Key, Fla	4	54	s.

Average relative humidity and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	82	0	Missouri Valley	74	+ 7
Middle Atlantic	84	+ 8	Northern Slope	63	+11
South Atlantic	86	+ 4	Middle Slope	68	+10
Florida Peninsula	82	+ 2	Southern Slope	72	+11
East Gulf	82	+ 2	Southern Plateau	54	+12
West Gulf	79	+ 4	Middle Plateau	46	+10
Ohio Valley and Tennessee	79	+ 7	Northern Plateau	42	- 2
Lower Lake	75	+ 4	North Pacific	74	- 5
Upper Lake	78	+ 3	Middle Pacific	63	+ 1
North Dakota	74	+10	South Pacific	68	+ 2
Upper Mississippi Valley	77	+ 7			

Average cloudiness and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	4.8	- 0.2	Missouri Valley	4.7	+ 0.6
Middle Atlantic	6.4	+ 1.4	Northern Slope	4.0	+ 0.3
South Atlantic	6.0	+ 0.8	Middle Slope	4.2	+ 0.4
Florida Peninsula	5.4	+ 0.2	Southern Slope	4.8	0.0
East Gulf	5.4	+ 0.5	Southern Plateau	3.8	+ 0.4
West Gulf	4.6	+ 0.2	Middle Plateau	3.6	+ 1.4
Ohio Valley and Tennessee	5.6	+ 1.1	Northern Plateau	3.1	+ 0.1
Lower Lake	4.4	- 0.1	North Pacific	4.4	+ 0.5
Upper Lake	4.8	0.0	Middle Pacific	4.0	+ 1.2
North Dakota	4.8	+ 0.9	South Pacific	2.6	+ 0.1
Upper Mississippi Valley	4.8	+ 0.7			

CLIMATOLOGICAL SUMMARY.

By Mr. JAMES BERRY, Chief of the Climatological Division.

TEMPERATURE AND PRECIPITATION BY SECTIONS, AUGUST, 1906.

In the following table are given, for the various sections of the Climatological Service of the Weather Bureau, the average temperature and rainfall, the stations reporting the highest and lowest temperatures with dates of occurrence, the stations reporting greatest and least monthly precipitation, and other data, as indicated by the several headings.

The mean temperatures for each section, the highest and

lowest temperatures, the average precipitation, and the greatest and least monthly amounts are found by using all trustworthy records available.

The mean departures from normal temperature and precipitation are based only on records from stations that have ten or more years of observation. Of course the number of such records is smaller than the total number of stations.

Section.	Temperature—in degrees Fahrenheit.						Precipitation—in inches and hundredths.					
	Section average.	Departure from the normal.	Monthly extremes.				Section average.	Departure from the normal.	Greatest monthly.		Least monthly.	
			Station.	Highest.	Date.	Station.	Lowest.	Date.	Station.	Amount.	Station.	Amount.
Alabama	80.4	+ 0.9	Newberne	102	25	Riverton	55	28, 30	Oneonta	11.23	Selma	0.66
Arizona	77.4	- 2.7	Casagrande	117	6	Quakingasp	33	24-26	Oracle	7.91	Seutinel	0.53
Arkansas	77.9	- 1.4	Jonesboro, Warren.	100	19	Harrison	42	28	Arnett	11.41	Cornerstone	0.50
California	73.6	+ 0.6	Mammoth Tank	124	12	Tamarack	34	24	Needles	5.66	Many stations	0.00
Colorado	64.2	- 1.2	Las Animas	106	21	Antelope Springs	25	26	Sugar City	4.90	Blaine	0.12
Florida	81.4	- 0.1	Madison	100	9, 10	Molino	62	4	Tarpon Springs	20.99	Pensacola	1.61
Georgia	80.1	+ 0.9	Brunswick	102	9, 10	Diamond	59	1	Glennville	12.81	Valdosta	1.49
Hawaii	+74.8		Fitzgerald	102	11	Humuhua, Hawaii	39	2	Houmanu V., Maui	34.99	Waipae ranch, Maui	0.00
Idaho	66.6	- 0.3	Kihei, Maui	95	7	Chesterfield	25	25	Weston	3.86	Pearl	T.
Illinois	76.3	+ 2.4	Cambridge	107	10	Kishwaukee	39	28	Palestine	9.97	Pontiac	0.80
Indiana	76.1	+ 2.7	Lewiston	107	11	3 stations	43	28	Marion	9.66	Syracuse	2.04
Iowa	74.1	+ 2.1	Cisne	101	1	Washta	33	27	Sibley	10.51	Allerton	0.92
Kansas	76.3	- 0.7	Mount Vernon	101	4	Hays	36	27	Baker	10.91	Lebanon	T.
Kentucky	77.4	+ 1.4	5 stations	98	4 dates	Earlington	45	28	Falmouth	8.96	Louisville	1.92
Louisiana	82.1	+ 0.6	Coolidge	105	22	5 stations	52	27-29	Pearl River	8.02	St. Francisville	0.25
Maryland and Delaware	75.2	+ 1.8	Maysville	99	24	Deer Park, Md.	47	15	Washington, D. C.	14.36	Oakland, Md.	2.98
Michigan	70.3	+ 4.4	Alexandria	105	22	Humboldt	31	31	Marlboro	9.40	Traverse City	0.82
Minnesota	68.7	+ 1.4	Lynd, Rouse	102	17	International Falls	27	31	Park Rapids	10.13	International Falls	0.53
Mississippi	80.6	+ 0.4	5 stations	101	6 dates	Ripley	51	29	Meridian	8.95	Jackson	0.75
Missouri	76.6	+ 0.3	Princeton	101	16	3 stations	40	27, 28	Warsaw	12.43	Nevada	1.28
Montana	64.3	- 0.6	Plentywood	103	15	Grayling	23	26, 30	Tokna	4.07	Plentywood	0.12
Nebraska	72.5	- 0.3	Lynch, Santee	104	16	Agate	36	26	Hartington	10.75	Guide Rock	0.95
Nevada	70.1	0.0	Logan	111	15	Winnabago	36	27	Geyser	4.93	4 stations	0.00
New England*	70.0	+ 2.7	Millinocket, Me.	102	19	Wells	26	25	Mount Tom, Mass.	8.01	Franklin Falls, N.H.	0.56
New Jersey	74.6	+ 2.4	Indian Mills	97	6	Woodstock, Vt.	33	17	Toms River	17.91	Bergen Point	2.21
New Mexico	68.7	- 1.9	San Marcial	105	1	Charlottesville	42	16	Elk	6.64	Rosa	0.30
New York	70.6	+ 3.7	Elmira	100	23	Red River	31	16, 29	Angelica	8.33	Appleton	1.44
North Carolina	78.2	+ 2.1	Moncure, Selma	98	11	Indian Lake	30	15	Henderson	16.00	Asheville	3.89
North Dakota	66.2	+ 0.4	Ellendale	107	19	Pink Beds	50	8	Donnybrook	3.30	Walhalla	0.34
Ohio	74.6	+ 3.1	Findlay	101	21	Lakota	31	31	Fremont	9.51	Bangorville	1.96
Oklahoma and Indian Territories.	77.6	- 3.1	Temple, Okla.	101	16, 30	Green Hill	43	28	Holdenville, Ind. T.	14.85	Keaton, Okla.	1.16
Oregon	67.0	+ 1.5	Beulah	108	4	Beaver, Okla.	41	27	Joseph	1.03	15 stations	0.00
Pennsylvania	73.2	+ 3.0	Freeport	96	6	(Granite	28	19, 20	Philadelphia (c)	11.65	Wilkes-Barre	1.62
Porto Rico	79.5	+ 1.2	San Lorenzo	103	22	Silver Lake	28	21	Las Marias	20.35	Santa Isabel	0.02
South Carolina	80.6	+ 1.2	3 stations	109	7, 10	Pocono Lake	53	13	Spartanburg	12.45	Allendale	2.00
South Dakota	69.9	- 0.3	Ashcroft	106	16, 18	Trenton	60	1	Plankinton	10.20	Spearfish	1.63
Tennessee	77.5	+ 1.1	Orman	106	17	Little Eagle	36	26, 27	Elizabethton	8.12	Center Point	1.28
Texas	80.0	- 1.8	Cedar Hill	101	21	Bolivar	50	30	Balling	12.54	Athens	0.50
Utah	68.9	- 0.7	Tilden	104	7	Rhineland	40	28	Morgan	4.57	Indianola	0.30
Virginia	76.2	+ 1.9	Fillmore	105	10	Coyoto	29	28	Callaville	16.75	Lynchburg	4.84
Washington	66.3	+ 0.6	Thistle	105	5	Hot Springs	50	31	Zindel	1.85	2 stations	0.00
West Virginia	75.4	+ 2.5	3 stations	98	6, 7, 9	Northport	30	20	Pickens	10.72	Cuba	2.18
Wisconsin	70.4	+ 2.8	Mottingers Ranch	108	10	New Cumberland	47	28	Brodhead	8.55	Menasha	1.37
Wyoming	62.1	- 0.6	Sutton	98	8	Prentice	32	31	Story	4.94	Cheyenne (ex. farm)	0.47
			Amherst, Neillsville.	98	20	Snake River, Y.N.P.	20	27				
			Alcova	105	17							

* Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut.

† 50 stations, with an average elevation of 767 feet.

‡ 147 stations.

DESCRIPTION OF TABLES AND CHARTS.

By Mr. P. C. DAY, Assistant Chief, Division of Meteorological Records.

For description of tables and charts see page 38 of Review for January, 1906.